

**ABSTRACT OF THE DISCLOSURE**

A process for deriving a power transfer function of a circuit. The power transfer function can be used to represent the real time power consumption of a circuit based on the status of the inputs. In one embodiment, the power transfer function is derived from frequency domain  
5 analysis of signals applied to the inputs of a circuit during tests of the circuit. In one embodiment, the inputs of the circuit are grouped in groups based on a commonality of power consumption of the signals. The inputs may be grouped by clustering squared coherencies associated with the inputs. The transfer function may be implemented in a power monitoring circuit having inputs coupled to the inputs of the circuit to provide a real time estimation of  
10 power consumption of the circuit.